

WHAT IS CLAIMED IS:

1. A stage assembly comprising:
a guide assembly including:
a guide bar movable in a first direction, the guide bar having a center of gravity and a guiding portion;
a stage movable along the guiding portion of the guide bar in a second direction substantially perpendicular to the first direction and exerting a reaction force on the guide bar in the second direction, the stage having a center of gravity substantially positioned in a plane parallel to the first and second directions, the plane parallel to the first and second directions having the center of gravity of the guide bar substantially positioned therein; and
an actuator component positioned on the guide bar substantially in the plane parallel to the first and second directions and aligned with the center of gravity of the stage in the second direction to apply a compensating force on the guide bar to cancel the reaction force exerted by the stage.
2. The stage assembly of claim 1, wherein the center of gravity of the stage and the center of gravity of the guide bar are aligned with each other in the second direction and the actuator component applies a force on the guide bar to control a position of the guide bar in the second direction.

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3. The stage assembly of claim 2, wherein the actuator component is a pair of E cores spaced apart from each other in the second direction.
4. The stage assembly of claim 2, comprising a pair of the guide assemblies spaced apart from each other in the first direction.
5. The stage assembly of claim 1, wherein the center of gravity of the stage and the center of the gravity of the guide bar are spaced apart from each other in the first direction and the guide assembly further includes another actuator component positioned substantially in the plane parallel to the first and second directions and aligned with the center of gravity of the guide bar in the second direction to apply a force on the guide bar to control a position of the guide bar in the second direction.
6. The stage assembly of claim 5, wherein the actuator component is positioned on one side of the guide bar and the another actuator component is positioned on the other side of the guide bar.
7. The stage assembly of claim 6, wherein each of the actuator component and the another actuator component is a pair of E cores spaced apart from each other in the second direction.
8. The stage assembly of claim 6, comprising a pair of the guide assemblies spaced apart from each other in the first direction.

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9. The stage assembly of claim 5, wherein the actuator component and the other actuator component are positioned on one side of the guide bar.
10. The stage assembly of claim 9, wherein each of the actuator component and the another actuator component is a pair of E cores spaced apart from each other in the second direction.
11. The stage assembly of claim 9, comprising a pair of the guide assemblies spaced apart from each other in the first direction.
12. An exposure apparatus including the stage assembly of claim 1.
13. An object manufacture with the exposure apparatus of claim 12.
14. A stage assembly comprising:
a guide assembly including:
a guide bar movable in a first direction, the guide bar having a center of gravity and a guiding portion;
a stage movable along the guiding portion of the guide bar in a second direction substantially perpendicular to the first direction and exerting a reaction force on the guide bar, the stage having a center of gravity spaced apart from the center of gravity of the guide bar in the first direction;

a first actuator component positioned on the guide bar and aligned with the center of gravity of the stage in the second direction to apply a compensating force on the guide bar to cancel the reaction force exerted by the stage; and

a second actuator component positioned on the guide bar and aligned with the center of gravity of the guide bar in the second direction to apply a force on the guide bar to control a position of the guide bar in the second direction.

15. The stage assembly of claim 14, wherein the first actuator component is positioned on one side of the guide bar and the second actuator component is positioned on the other side of the guide bar.

16. The stage assembly of claim 15, wherein each of the first and second actuator components is a pair of E cores spaced apart from each other in the second direction.

17. The stage assembly of claim 15, comprising a pair of the guide assemblies spaced apart from each other in the first direction.

18. The stage assembly of claim 14, wherein the first and second actuator components are positioned on one side of the guide bar.

19. The stage assembly of claim 18, wherein each of the first and second actuator components is a pair of E cores spaced apart from each other in the second direction.

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20. The stage assembly of claim 18, comprising a pair of the guide assemblies spaced apart from each other in the first direction.

21. An exposure apparatus including the stage assembly of claim 14.

22. An object manufactured with the exposure apparatus of claim 21.

23. A stage assembly comprising:

a guide assembly including:

a first moving member movable in a first direction, the first moving member having a center of gravity;

a second moving member movable in a second direction substantially perpendicular to the first direction, the second moving member having a center of gravity substantially positioned in a plane parallel to the first and second directions, the plane parallel to the first and second directions having the center of gravity of the first moving member substantially positioned therein; and

an actuator, at least part of the actuator being positioned on the first moving member, the actuator generating a force acting on the first moving member in the second direction, wherein a portion where the force acts on the first moving member is substantially positioned in the plane parallel to the first and second directions and aligned with the center of gravity of the second moving member in the second direction.

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24. The stage assembly of claim 23, wherein:

the actuator, the force acting on the first moving member, and the portion where the force acts on the first moving member are, respectively, a first actuator, a first force, and a first portion;

the center of gravity of the first moving member and the center of gravity of the second moving member are spaced apart from each other in the first direction; and

the guide assembly further comprises a second actuator, at least part of the second actuator being positioned on the first moving member, the second actuator generating a second force acting on the first moving member in the second direction, wherein a second portion where the second force acts on the first moving member is substantially positioned in the plane parallel to the first and second directions and aligned with the center of gravity of the first moving member in the second direction.

25. A stage assembly comprising:

a guide assembly including:

a first moving member movable in a first direction, the first moving member having a center of gravity;

a second moving member movable in a second direction substantially perpendicular to the first direction, the second moving member having a center of gravity spaced apart from the center of gravity of the first moving member in the first direction;

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a first actuator, at least part of the first actuator being positioned on the first moving member, the first actuator generating a first force acting on the first moving member in the second direction, wherein a first portion where the first force acts on the first moving member is substantially aligned with the center of gravity of the second moving member in the second direction; and

a second actuator, at least part of the second actuator being positioned on the first moving member, the second actuator generating a second force acting on the first moving member in the second direction, wherein a second portion where the second force acts on the first moving member is substantially aligned with the center of gravity of the first moving member in the second direction.

26. A method for driving a stage assembly comprising a first moving member and a second moving member, the method comprising the steps of:

driving the first moving member in a first direction;

driving the second moving member in a second direction substantially perpendicular to the first direction; and

applying a force on the first moving member at a portion in the second direction, wherein a center of gravity of the first moving member and a center of gravity of the second moving member are substantially positioned in a plane parallel to the first and second directions, and

wherein the portion is substantially positioned in the plane parallel to the first and second directions and aligned with the center of gravity of the second moving member in the second direction.

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27. The method of claim 26, wherein:

the force applied on the first moving member and the portion are, respectively, a first force and a first portion;

the center of gravity of the first moving member and the center of gravity of the second moving member are spaced apart from each other in the first direction; and

the method further comprises the step of applying a second force on the first moving member at a second portion in the second direction, the second portion being substantially positioned in the plane parallel to the first and second directions and aligned with the center of gravity of the first moving member in the second direction.

28. A method for driving a stage assembly comprising a first moving member and a second moving member, the method comprising the steps of:

driving the first moving member in a first direction;

driving the second moving member in a second direction substantially perpendicular to the first direction;

applying a first force on the first moving member at a first portion in the second direction to cancel a reaction force exerted by the second moving member; and

applying a second force on the first moving member at a second portion in the second direction to control a position of the first moving member in the second direction,

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Country	Year	Population (millions)	Urban population (millions)	Urban population (%)	Population density (per sq km)	Urban population density (per sq km)
Algeria	1980	10.0	4.0	40.0	100.0	400.0
Algeria	1985	10.5	4.5	42.9	105.0	429.0
Algeria	1990	11.0	5.0	45.5	110.0	455.0
Algeria	1995	11.5	5.5	47.8	115.0	478.0
Algeria	2000	12.0	6.0	50.0	120.0	500.0
Algeria	2005	12.5	6.5	52.0	125.0	520.0
Algeria	2010	13.0	7.0	53.8	130.0	538.0
Algeria	2015	13.5	7.5	55.6	135.0	556.0
Algeria	2020	14.0	8.0	57.1	140.0	571.0
Algeria	2025	14.5	8.5	58.6	145.0	586.0
Algeria	2030	15.0	9.0	60.0	150.0	600.0
Algeria	2035	15.5	9.5	61.3	155.0	613.0
Algeria	2040	16.0	10.0	62.5	160.0	625.0
Algeria	2045	16.5	10.5	63.6	165.0	636.0
Algeria	2050	17.0	11.0	64.7	170.0	647.0
Algeria	2055	17.5	11.5	65.7	175.0	657.0
Algeria	2060	18.0	12.0	66.7	180.0	667.0
Algeria	2065	18.5	12.5	67.6	185.0	676.0
Algeria	2070	19.0	13.0	68.4	190.0	684.0
Algeria	2075	19.5	13.5	69.2	195.0	692.0
Algeria	2080	20.0	14.0	70.0	200.0	700.0
Algeria	2085	20.5	14.5	70.7	205.0	707.0
Algeria	2090	21.0	15.0	71.4	210.0	714.0
Algeria	2095	21.5	15.5	72.1	215.0	721.0
Algeria	2100	22.0	16.0	72.7	220.0	727.0
Algeria	2105	22.5	16.5	73.3	225.0	733.0
Algeria	2110	23.0	17.0	73.9	230.0	739.0
Algeria	2115	23.5	17.5	74.5	235.0	745.0
Algeria	2120	24.0	18.0	75.0	240.0	750.0
Algeria	2125	24.5	18.5	75.5	245.0	755.0
Algeria	2130	25.0	19.0	76.0	250.0	760.0
Algeria	2135	25.5	19.5	76.5	255.0	765.0
Algeria	2140	26.0	20.0	76.9	260.0	769.0
Algeria	2145	26.5	20.5	77.3	265.0	773.0
Algeria	2150	27.0	21.0	77.8	270.0	778.0
Algeria	2155	27.5	21.5	78.2	275.0	782.0
Algeria	2160	28.0	22.0	78.6	280.0	786.0
Algeria	2165	28.5	22.5	78.9	285.0	789.0
Algeria	2170	29.0	23.0	79.3	290.0	793.0
Algeria	2175	29.5	23.5	79.7	295.0	797.0
Algeria	2180	30.0	24.0	80.0	300.0	800.0
Algeria	2185	30.5	24.5	80.3	305.0	803.0
Algeria	2190	31.0	25.0	80.6	310.0	806.0
Algeria	2195	31.5	25.5	81.0	315.0	810.0
Algeria	2200	32.0	26.0	81.3	320.0	813.0
Algeria	2205	32.5	26.5	81.6	325.0	816.0
Algeria	2210	33.0	27.0	81.8	330.0	818.0
Algeria	2215	33.5	27.5	82.1	335.0	821.0
Algeria	2220	34.0	28.0	82.4	340.0	824.0
Algeria	2225	34.5	28.5	82.6	345.0	826.0
Algeria	2230	35.0	29.0	82.9	350.0	829.0
Algeria	2235	35.5	29.5			

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